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AUTHOR Demerjian, Marlene D.
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INSTITUTION College of the Canyons, Santa Clarita, CA.
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ABSTRACT

A study was undertaken at the College of the Canyons, in California, to assess the variation of grades given by mathematics instructors teaching intermediate algebra. A sample was drawn from all instructors who taught Math 070 repeatedly from fall 1990 to fall 1994, resulting in the examination of the grades of at least 200 students from classes taught by 4 full-time faculty. A grade point average (GPA) was computed for each instructor by dividing the total grade points by the number of grades given. Withdrawals were tabulated separately. The GPA's of all four instructors were compared and an analysis of variance was used to determine significant differences between instructors. Variance was compared within and between instructor groups to determine significance. This ratio was found to be 2.29, not significant at the 0.05 level, suggesting there were no meaningful differences in grading between instructors. An analysis by instructor indicated that for the sample period, instructor number 1 had a success rate (i.e., grades of at least a C or credit divided by the total grades) of 68.5% (450 completed) and a withdrawal rate of 31.5% (207 withdrew); instructor number 2 had a success rate of 71.2% (242 completed) and a withdrawal rate of 28.8% (98 withdrew); instructor number 3 had a success rate of 63.9% (384 completed) and a withdrawal rate of 36.1% (217 withdrew); and instructor number 4 had a success rate of 63.3% (420 completed) and a withdrawal rate of 36.7% (244 withdrew). Data tables and charts are included. (KP)

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College of the Canyons
SANTA CLARITA COMMUNITY COLLEGE DISTRICT

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Matriculation Research Project
Marlene D. Demerjian

June 1995

JC 950 417

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Determining Faculty Grading Variation

The purpose of this study was to assess the variation of grades among mathematics instructors teaching intermediate algebra (Math 070). The research question was: Do grade point averages (GPA's) vary significantly for instructors who teach Math 070?

METHOD

Math 070 was selected as the target course because it met the following criteria:

- Must be a multi-section course.
- Must have more than one instructor teaching the course.
- Must be GE applicable for the AA degree.

A sample was drawn from all instructors who taught Math 070 repeatedly from Fall 1990 through Fall 1994. The sample consisted of four full-time faculty. In an effort to make the study reliable (that is, to avoid possible effects of confounding variables) at least 200 students were sampled for each instructor.

The criterion measure that was used in this study was instructor grade point average (GPA) . A GPA was computed for each instructor by dividing the total grade points by the number of grades given with an A grade equal to 4 points, B=3, C=2, D=1, F=0. Withdrawals (W's) were tabulated separately and reported for each instructor as a W-rate (W's divided by total enrollment).

The GPA's of all four instructors were compared and a one-way analysis of variance was used to determine significant differences between instructors. The analysis of variance consists of these operations :

1. The variance of the GPA's for the four instructors are combined into one composite group, known as the *total groups variance* (V_t)

2. The mean value of the variances of each of the four instructors, computed separately, is known as the *within-groups variance* (V_w)
3. The difference between the total groups variance and the within-groups variance is known as the *between-groups variance* ($V_t - V_w = V_b$).
4. The *F* ratio is computed

$$F = \frac{V_b}{V_w} = \frac{\text{between - groups variance}}{\text{within - groups variance}}.$$

5. If the *between-groups variance* is not substantially greater than the *within-groups variance*, the researcher would conclude that the difference between the grades is probably only a reflection of sampling error. If the *F* ratio were substantially greater than one, it would seem that the ratio of the *between-groups variance* and the *within-groups variance* was probably too great to attribute to sampling error.

RESULTS

To determine differences between instructors, a one-way ANOVA for independent data was conducted with student grades. Table 1 is a summary ANOVA for the data.

Table 1
One-way Independent ANOVA on Grades by Instructor

Source	SS	df	MS	F	P-val
Between Instructors	12.85	3	4.28	2.29	0.076
Within Instructors	2784.74	1492	1.87		
Total	2797.59	1495			

Table 2 summarizes the mean and the standard deviation of the GPA's for each instructor.

Table 2
Descriptive Statistics by Instructor

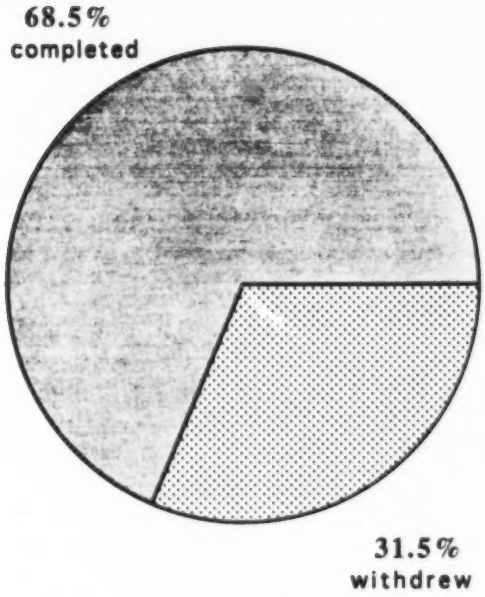
Instructor	Mean	SD	n
1	2.009	1.374	450
2	1.880	1.350	242
3	1.839	1.399	384
4	2.064	1.335	420
All Instructors	1.948	1.365	1496

The *F* of 2.29 was not found to be statistically significant at the 0.05 level suggesting that there are no meaningful differences in grading between instructors.

The W grade notation was tabulated separately and reported for each instructor. The following figures represent the completion and withdrawal rates for each instructor.

Figure 1

COMPLETION/WITHDRAWAL RATE FOR INSTRUCTOR 1



N= 657

From Fall 1990 to Fall 1994 450 students completed Math 070 and 207 students withdrew Therefore the *W* rate for instructor 1 was 31.5 percent. Completion means that students received either a passing grade (A, B, C, D, or credit) or failed. The success rate (A+B+C+Cr divided by total completed) for instructor 1 was 68 percent.

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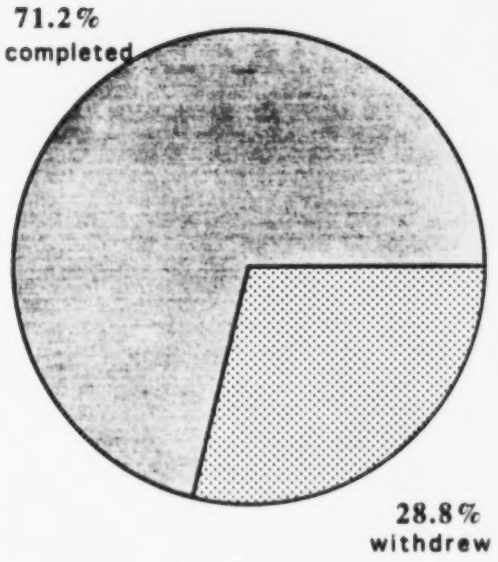
Figure 2

COMPLETION/WITHDRAWAL RATE FOR INSTRUCTOR 2



N= 340

From Fall 1990 to Fall 1994 242 students completed Math 070 and 98 students withdrew Therefore the *W* rate for instructor 2 was 28.8 percent. The success rate (A+B+C+Cr divided by total completed) for instructor 2 was 65 percent.

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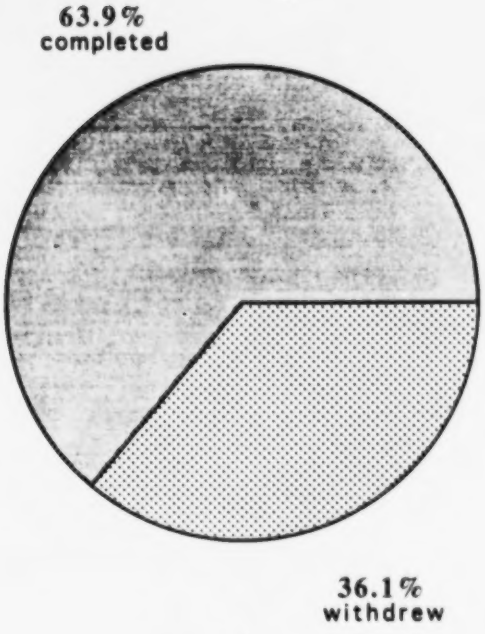
Figure 3

COMPLETION/WITHDRAWAL RATE FOR INSTRUCTOR 3



N= 601

From Fall 1990 to Fall 1994 384 students completed Math 070 and 217 students withdrew Therefore the *W* rate for instructor 3 was 36.1 percent. The success rate (A+B+C+Cr divided by total completed) for instructor 3 was 61 percent.

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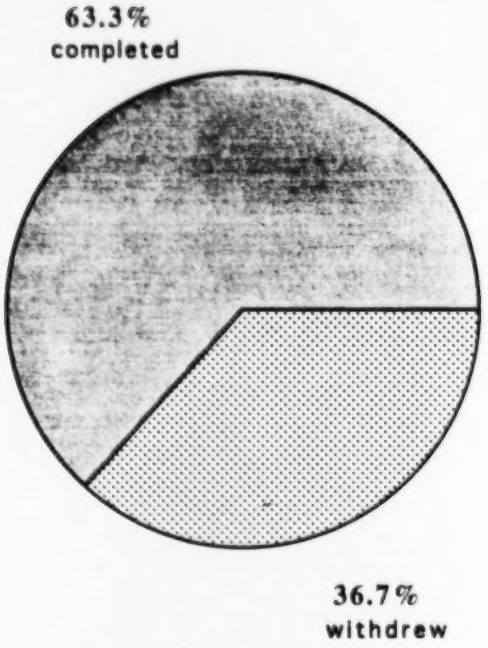
Figure 4

COMPLETION/WITHDRAWAL RATE FOR INSTRUCTOR 4



N= 664

From Fall 1990 to Fall 1994 420 students completed Math 070 and 244 students withdrew Therefore the *W* rate for instructor 4 was 36.7 percent. The success rate (A+B+C+Cr divided by total completed) for instructor 4 was 70 percent.

FUTURE RESEARCH

Future research may be needed to determine whether or not grade variation exists in other mathematics courses and courses in other departments. Also, research may be needed to determine the extent of grade variation between adjunct and full-time faculty.